TRANSIMS:
TRansportation ANalysis SIMulation System

Version: TRANSIMS-LANL-2.1

VOLUME SIX—INSTALLATION

15 June 2001

LA-UR-00-1767

Los Alamos
NATIONAL LABORATORY

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VOLUME SIX—INSTALLATION

15 June 2001

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Acknowledgments

This work was supported by the U. S. Department of Transportation (Assistant Secretary for Transportation Policy, Federal Highway Administration, Federal Transit Administration), the U.S. Environmental Protection Agency, and the U.S. Department of Energy as part of the Travel Model Improvement Program.

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1. WHAT'S ON THE CD-ROM?

The TRANSIMS distribution found on the CD-ROM contains the directory structure shown in

Fig. 1. Once installed, the distribution's root directory is referred to as *TRANSIMS_HOME*.

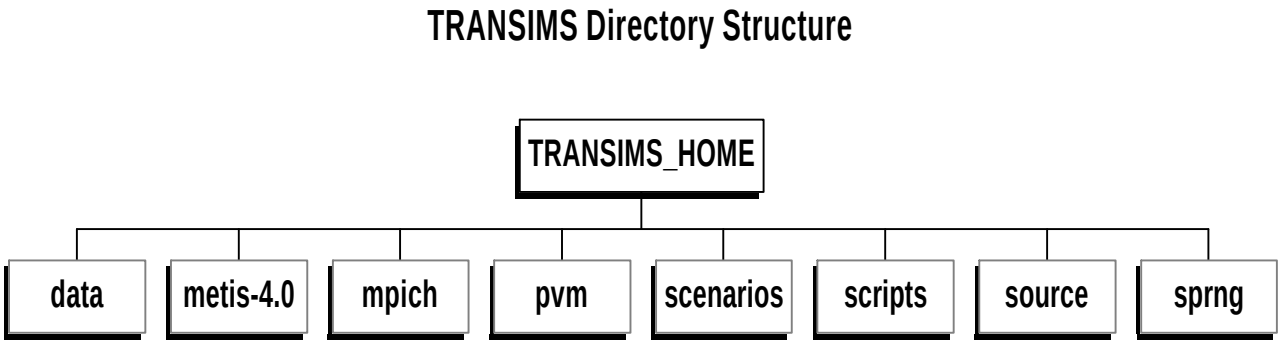

Fig. 1. Directory structure found on the TRANSIMS CD-ROM.

1.1 Distribution Description

1.1.1 *data* Directory

The *data* directory contains data for the Population Synthesizer and Emissions Estimator.

1.1.2 *metis-4.0* Directory

The *metis-4.0* directory contains the distribution of *metis-4.0* used by the Traffic Microsimulator to partition the transportation network among the available CPUs.

1.1.3 *mpich* Directory

The *mpich* directory contains Message Passing Interface (MPI) distribution 1.2.0, which is used by the Traffic Microsimulator for parallel communications.

1.1.4 *pvm* Directory

The *pvm* directory contains the distribution of Parallel Virtual Machine (PVM) 3.4.3, which is used by the Traffic Microsimulator.

1.1.5 *scenarios* Directory

The *scenarios* directory (see Fig 2) contains subdirectories of scenarios to run the TRANSIMS components.

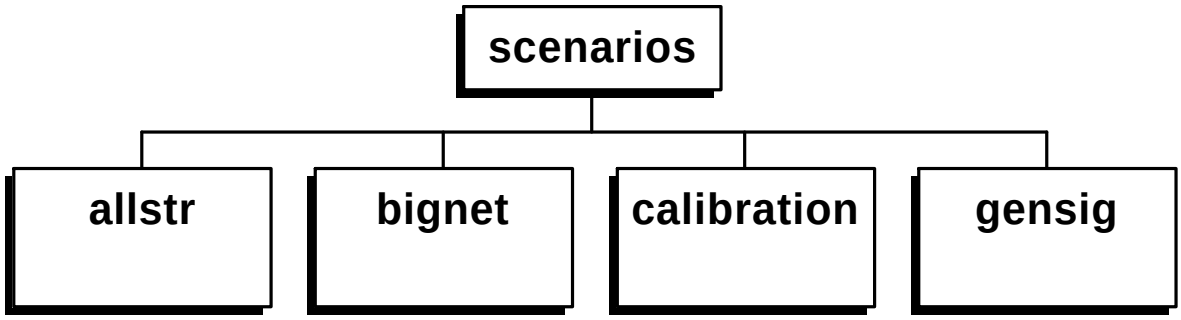

Fig. 2. Scenarios in TRANSIMS distribution.

- ***allstr*** – Scenario based on Portland, Oregon network and data. The network contains ~ 125,000 links.
- ***bignet*** – A large multimode scenario and network used to run the TRANSIMS components. The network contains ~16000 links**.**
- ***calibration*** – The microsimulation calibrations, which consist of one- and three-lane freeways, two-lane left turn, two-lane merge, and tee intersection networks.
- ***gensig*** – Creates generic signals for calibration and testing using the generic signal builder.

1.1.6 *scripts* Directory

The *scripts* directory contains scripts used to process data or control TRANSIMS modules.

1.1.7 *source* Directory

The *source* directory contains the following source code subdirectories for the TRANSIMS components.

- *ACT* – TRANSIMS Activity Generator
- *ACTL* – Simplified Activity Generator
- *CA, PAR, TBX* – Traffic Microsimulator
- *CALIB* – Traffic Microsimulator calibration output filters
- *ENV* – Emissions Estimator
- *GBL* – Global definitions and methods used by other TRANSIMS components

- *IO* – TRANSIMS file interface definitions and methods
- *ITDB* – Iteration Database
- *NET* – TRANSIMS Network
- *OUT* – TRANSIMS Output
- *PLAN* – TRANSIMS route plan definition and methods
- *POPL* – Simplified Population Generator
- *ROUTER, THREADS* – Route Planner
- *SEL* – TRANSIMS Selector/Iteration Database
- *SYNPOP* – Population Synthesizer
- *TRANSIT* – Transit methods
- *TRAV* – Traveler definitions
- *VEH* – TRANSIMS Vehicle file generator
- *VIS, mui* – Output Visualization

The ***source*** directory also contains the following files for the TRANSIMS components.

- *Makefile* – a symbolic link to *source/Makefile.main.* This file is used to compile the TRANSIMS components in the *TRANSIMS_HOME* directory.
- *Makefile.** – *Makefile* files for compilation of TRANSIMS components.
- *fstream, iostream, sstream* – special include files for TRANSIMS components.

1.1.8 *sprng* Directory

The *sprng* directory contains the distribution of the scalable parallel random number generator libraries from the National Center for Supercomputing Applications as part of the DARPA/ITO Scalable Software Library Technology Initiative. This is the random number generator used by many of the TRANSIMS modules.

2. SYSTEM REQUIREMENTS

2.1 Hardware Requirements

This version of TRANSIMS-LANL was tested on a Linux cluster with 64 dual processor nodes with one gigabyte of memory per node. Each processor is a 500 MHz Pentium III. The Allstr scenario was tested on this cluster. Other scenarios (Bignet, Calibration, Gensig, Synpop) were tested on single CPU Linux systems. Memory and disk requirements depend upon the scenario that is used.

2.1.1 Memory Requirements

- The Gensig and Calibration scenarios use less than 120 megabytes.
- The Bignet scenario needs at least 512 megabytes.
- The Allstr scenario needs a cluster environment for parallel computing. See the Allstr scenario description for cluster memory requirements.
- Memory requirements for the Output Visualizer depend on the size of the data files and are controllable by the user when the Visualizer is run.

2.1.2 Disk Requirements

For the Calibration, Gensig, and Bignet scenarios, five gigabytes of disk space support the execution and data collection for TRANSIMS components using the output specifications in the TRANSIMS configuration files supplied with the distribution. If the user increases output collection, additional disk space may be required. The Allstr scenario will require 20 gigabytes or more.

2.1.3 Operating System

TRANSIMS-LANL was tested in a Linux cluster environment on RedHat Linux 6.2 and compiled with gcc/g++ 2.95.2. The Allstr scenario was compiled and tested in this Linux cluster environment.

Limited tests in a single CPU environment were done on RedHat Linux 7.1 using gcc/g++ 2.96. The Bignet and Calibration scenarios were compiled and tested in the single CPU environment.

2.1.3.1 Linux

To run the Traffic Microsimulator under PVM or MPI, the Linux kernel must be compiled with networking support and must have assigned an IP address and a host name.

An actual network card is not required. The following options must be selected in the Linux kernel configuration:

- networking support (`CONFIG_NET`),
- System V IPC (`CONFIG_SYSVIPC`),
- TCP/IP networking (`CONFIG_INET`),
- dummy-net driver support (`CONFIG_DUMMY`), or
- the appropriate network card driver.

The default kernel shipped with Red Hat 6.2 and 7.1 is configured with the appropriate options. The following package categories should be selected during Red Hat Linux installation to run the TRANSIMS components:

- X Window System,
- Mesa/GL, and
- Glut.

Additional package categories should be selected to compile the TRANSIMS components:

- C Development,
- Development Libraries,
- C++ Development, and
- X Development.

2.1.3.2 Solaris

To run the Traffic Microsimulator under PVM or MPI, the machine must have an IP address and a host name assigned.

2.2 Software Requirements

The TRANSIMS distribution requires that the user install the following software.

2.2.1 Linux

- X11R6 libraries (*Xmu, Xi, X11, Xext, Xt*)
- OpenGL and the OpenGL Utilities Toolkit libraries (*Mesa*/*glut*)
- Linux libraries (*stdc++, ld-linux, ICE, SM*)

- Perl

All of the third-party software used by TRANSIMS is available on Red Hat Linux distribution CD-ROMs. The latest versions of the following packages should be installed: kernel, kernel-headers, gcc, glibc, libstdc++, make, perl, XFree86, Mesa, Mesa-devel, Mesa-glut, Mesa-glut-devel, MPI, and Pvm.

2.2.2 Solaris

- XllR6 libraries in /usr/openwin, OpenGL, OpenGL Utilities Toolkit libraries (glut), and Perl
- *Metis*, *pvm*, *mpi*, and *sprng* are supplied with the TRANSIMS distribution

The third-party software that can be obtained from the World Wide Web sites listed in Table 1.

Table 1. Software—World Wide Web sites.

Software	World Wide Web site
Gnu C++ compiler	www.gnu.org/software/gcc/gcc.html
Mesa	http://www.mesa3d.org/download.html
Glut	http://www-users.cs.unm.edu/~karpis/metis/
PVM	http://www.epm.ornl.gov/pvm/pvm_home.html
MPI	http://www-unix.mcs.anl.gov/mpi/mpich
Perl	http://language.perl.com

3. INSTALLING TRANSIMS

TRANSIMS requires that the operating system be installed with the software described in Section 2. The TRANSIMS distribution uses 1.7 gigabytes of disk space.

3.1 Installation Instructions

We have divided the installation process into seven steps.

Step One

- Select a directory in which the distribution will reside. In these instructions, we will refer to this directory as TRANSIMS_HOME.
- TRANSIMS users must have read and write permissions in this directory.

Step Two

- Mount/open the CD-ROM.

Linux:

- This operation may require root permissions.
- On Red Hat Linux, the CD-ROM directory is /mnt/cdrom. This directory may be different on other Linux distributions.
- The directory in which the CD-ROM is mounted will be referred to as CD_ROM_DIRECTORY:

```
% /bin/mount <CD_ROM_DIRECTORY>
```

Example:

```
% /bin/mount /mnt/cdrom
```

Solaris:
Use the file manager program (*filemgr*) to open the CD-ROM. The *CD_ROM_DIRECTORY* will be */cdrom/transims_lanl_2_1*.

Step Three

- The installation script copies the TRANSIMS distribution from the CD-ROM to the *TRANSIMS_HOME* directory and installs it.
- Run the installation script on the CD-ROM by using the following command:

```
% /bin/sh <CD_ROM_DIRECTORY>/install.sh <CD_ROM_DIRECTORY> <TRANSIMS_HOME>
```

Example:

Linux:

```
% /bin/sh /mnt/cdrom/install.sh /mnt/cdrom /home/transims
```

Solaris:

```
%/bin/sh /cdrom/transims_lanl_2_1/install.sh /cdrom/transims_lanl_2_1 /home/transims
```

Step Four

- Make sure that you have read and write permissions on the *TRANSIMS_HOME* directory and subdirectories.
- If necessary, change the file permissions in the TRANSIMS distribution.

Step Five

- Set the environment variable *TRANSIMS_HOME* for all users to run TRANSIMS.
- Bash Shell: Add the following line to your *.profile*

```
% export TRANSIMS_HOME=<full path name of directory where TRANSIMS is installed>
```

- C-Shell: Add the following line to your *.cshrc*

```
% setenv TRANSIMS_HOME <full path name of directory where TRANSIMS is installed>
```

Step Six

- If your distribution did not include binaries, compile the TRANSIMS modules using the instructions in Section 3.2.

Step Seven

- Before starting the Output Visualizer program (*Vis*) make sure that you are running X Windows.

Linux:

- To start the X server, use the *startx* command (`/usr/X11R6/bin/startx`).

Solaris:

The X server on Solaris is usually started automatically at boot time.

3.2 Compilation

3.2.1 Compilation Requirements

The TRANSIMS distribution contains the source code for the TRANSIMS modules. If you did not receive binaries in your distribution or if you wish to run TRANSIMS on a hardware platform different from those specified above, you must compile the TRANSIMS modules. The following software must be installed to compile TRANSIMS:

- Compiler—Gnu C++ (gcc 2.95.2 or higher).
- Mesa/Glut Version 3.0 or higher
- X11R6 (include files and libraries)
- *metis*, *pvm*, *mpi*, and *sprng* from TRANSIMS distribution or the equivalent versions
- Gnu make

3.2.1.1 Compilation Instructions

Step One Install the appropriate software as described above and set the environment variable `TRANSIMS_HOME` to point to the root directory of the TRANSIMS distribution.

Step Two The file *TRANSIMS_HOME/source/Makefile.SITE* specifies the site-specific locations for the compiler and required software for compiling TRANSIMS. Edit this file to customize for your site.

See the Release Notes supplied with the distribution for important compilation instructions specific to this release.

Step Three Change directory to *TRANSIMS_HOME* and run the *buildit* script:

```
% cd $TRANSIMS_HOME
% ./buildit
```

The file *TRANSIMS_HOME/errs* is a log of the build process. Information messages and errors will be reported in this file. If you want to track the progress of the compilation process, edit the *buildit* script and remove the lines that direct output into the logfile *errs*.

TRANSIMS *makefiles* require Gnu *make*. Other *make* utilities will not work with these *makefiles*. The *buildit* script searches for the *make* utility in */usr/local/bin and /usr/bin* directories.

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